

A.D. 1882, 20th DECEMBER. N° 6089.

**Treatment of Fermented Liquors for the Removal and
Prevention of Acidity.**

LETTERS PATENT to Alfred Gordon Salamon of Clapham Park in the County of Surrey Associate of the Royal School of Mines and Fellow of the Chemical Society for an Invention of "IMPROVEMENTS IN THE TREATMENT OF FERMENTED LIQUORS FOR THE REMOVAL AND PREVENTION OF ACIDITY"

PROVISIONAL SPECIFICATION left by the said Alfred Gordon Salamon at the Office of the Commissioners of Patents on the 20th December 1882.

ALFRED GORDON SALAMON of Clapham Park in the County of Surrey, Associate of the Royal School of Mines, and Fellow of the Chemical Society "IMPROVEMENTS IN THE TREATMENT OF FERMENTED LIQUORS FOR THE REMOVAL AND PREVENTION OF ACIDITY."

The object of this invention is to effect the immediate removal of any acidity which may be present in beers and other fermented liquors, and to prevent the recurrence of such acidity. The acidity of beer is principally due to the development of the ferment commonly known as *mycoderma aceti*, and the development of this fungus is attended with the formation of acetic acid proportional to its growth, so that the acetic acid produced is a measure of the ferment.

As is well known, borax is a sodium salt of meta-boracic acid, and my invention is based upon the fact that boracic acid is a weaker acid than acetic acid, that is to say it is less eager than is acetic acid to form salts with bases such as soda.

If therefore borax be present during the production of the acetic acid the latter will decompose a certain amount of the borax owing to the affinity above alluded to, and will liberate boracic acid. This acid is, as is well known, fatal to the further development of the fungoid growth with which it is brought in contact.

By the partial decomposition of the borax, acetate of soda is formed which is freely soluble in the beer, and renders inert the acetic acid present, while the boracic acid liberated is then capable of acting upon the ferment which gave rise to the acetic acid neutralized.

[Price 4d.]

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The amount of borax decomposed is thus the measure of the acetic acid present, and the amount of boracic set free is a measure of the amount required to destroy the ferment.

The borax must be present in sufficient quantity to constitute a reserve which will neutralize the acetic acid as it is produced, and set free in so doing the anti-septic boracic acid. 5

This re-agent does not in any way interfere with those ferments producing acids which are weaker than boracic acid, and this is an important fact when considered in its relation to the acids produced during the development of harmless ferments.

It will be understood that the borax is mainly intended to prevent the recurrence of acidity in fermented liquors, the immediate acidities being removed by any of the ordinary innocuous alkaline re-agents, such as the carbonates of potash and soda, and I make use of these reagents in combination in such a manner that the beer may be permanently deprived for all practical purposes of any harmful acidity. 10

I would remark that, instead of using borax as an antacid, I may employ salicylate of soda or some other harmless alkaline salt of salicylic or boracic acid for the purpose above explained. 15

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SPECIFICATION in pursuance of the conditions of the Letters Patent filed by the said Alfred Gordon Salamon in the Great Seal Patent Office on the 20th June 1883.

ALFRED GORDON SALAMON of Clapham Park in the County of Surrey Associate of the Royal School of Mines and Fellow of the Chemical Society IMPROVEMENTS IN THE TREATMENT OF FERMENTED LIQUORS FOR THE REMOVAL AND PREVENTION OF ACIDITY

This Invention relates to the use of alkaline Borates as a preservative and antacid for all classes of Beer

The acidity in Beer may be attributed to two causes, the direct oxidation of some of the component parts of the Beer into acids, and the indirect oxidation of some of its constituents into acids by the agency of the various specialized organisms well known to Brewers under the names of the various ferments such as the lactic ferment, the acetic ferment &c. It is this last method of oxidation which is the chief cause of Beer turning sour, and this more especially in climates which are sufficiently warm to induce a rapid growth of the organisms above referred to

The acidity in Beer has generally been met by the Brewer with the addition of an alkali in various forms, the same being used in such quantity as to neutralize the acidity sufficiently to conceal its taste. This method of treatment is however inadequate inasmuch as it only temporarily removes the evil without destroying the organism which has given rise to it. An efficient antacid should not only be capable of neutralizing or fixing the acidity, but of destroying the ferment which produced the acidity—Moreover the antacid should not be added in sufficiently large quantities to affect what may be termed the "healthy after fermentation" of the Beer; that is the fermentation which induces the evolution of a sufficient amount of carbonic acid to give "condition" to the beer. But the antacid should be capable of being brought into action as it is required, that is as the acid to be neutralized makes its appearance; and the amount so brought into action should be proportional to the amount of acid produced and hence also proportional to the amount of ferment which gives rise to the acid.

I have found by experiment that these conditions are fulfilled by the use of the alkaline Borates but more especially of magnesian Borate, either in the solid condition or dissolved either by making a saturated aqueous solution or by assisting its solution by the addition to the water of about half the bulk of pure and sound beer and gently heating

I will now proceed to explain the use of this salt as a preservative and antacid

Boric acid is a weak acid inasmuch as its affinity for the bases is not strong: not so strong, for example, as acetic and many other acids. Hence it may be easily displaced from its combinations with bases by contact with such acids. Thus magnesian borate would be decomposed by contact with acetic acid and the resulting products of the decomposition would be acetate of magnesia and boric acid. Now Borate of magnesia, as a salt, is inert as regards its effect upon organisms, but boric acid has a very deadly action upon them, and it is for this reason that it is highly objectionable to add boric acid, as such, as a preservative since it would rapidly render the Beer flat, stale and consequently unprofitable. On the other hand I find that it is desirable to produce boric acid in minute quantities at a time in the fermented liquor intended to be preserved, and I allow of these small quantities being produced by permitting the acids as they are generated in traces by the action of the ferments to decompose equivalent traces of the Borate of

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magnesia. The acid thus generated after it has done its work in decomposing the salt is rendered inert and tasteless in the Beer by reason of its union with the magnesian base.

I preferably use the Borate of magnesia for the following reasons. Borax (one of the soda salts of Boracic acid) has a soapy taste, whereas the flavour of the magnesian borate is scarcely to be detected. Moreover acetate of soda, which has a very objectionable cold saline taste, is a most powerful diuretic, and as such is largely dispensed; whereas I can find no mention of the magnesian salt having a similar action, or being used for similar purposes. In addition to this acetate of magnesia, the resulting product of my decomposition has a most peculiar warm and sweet mawkish flavour and when mixed in Beer even in very large quantities its presence can scarcely be detected by the palate; the flavour of the Beer and of the acetate being somewhat akin in character. The lime Borates are not so useful because they are not so soluble, but they may be used with advantage if desired.

In determining the proper quantity of magnesian Borate to add to the beer the Brewer must be guided by reasons which owing to the present state of chemical knowledge are more or less empirical.

Experiments have shewn that good results are obtained by the use of magnesian Borate in the proportions of from three-quarters of an ounce avoirdupois to one ounce avoirdupois, to one barrel of thirty-six gallons (imperial measure) of Beer; but I wish it to be distinctly understood that I do not confine myself to the proportions within these limits. It is a matter which will vary with the special modifications of each plant, and will probably require adjustment at the discretion of the Brewer.

I may remark that I am well aware that Boracic acid has long been known as an arrester of fermentation and that it has been used by the Excise authorities in order that they might transport their samples to their laboratories without their undergoing chemical change en route; but as an antacid or neutralizer of acidity, Boracic acid would play no part at all, and as a preservative in Beer intended for consumption it would if added in anything approaching the quantities I have indicated for the proper proportion of the Borate, at once render the Beer unsaleable for the reasons already adduced. Moreover its action would be practically instantaneous inasmuch as it would at once destroy all fungoid life, and put an end to further growth; but when the Boracic acid is added in its combined form according to my invention its action will only be called into play as it is liberated, and it is then and then only that a preservative is required for marketable Beer.

I am also aware that advantage has been taken of the fact that solutions of the Borates are good solvents of many organic bodies to dissolve salicylic acid and similar bodies not especially easy of solution, but in such cases the salicylic acid or kindred body has been supposed to be the effective antiseptic agent, and the combinations have been abandoned on the ground of useless expense.

One of the chief advantages resulting from the application of the Borates alone is their cheapness, since they are substances the manufacture of which does not involve any monopoly and since the supply of material is abundant and they are readily produced in a state of purity at a low cost.

The chief advantages which I claim for my improved mode of treating fermented liquors by the use of the alkaline Borates, and more especially of magnesian Borate, may be thus summarized.

1. The combination of the elements of a preservative and an antacid in a cheap and convenient form.

2. In the neutralization of the acid, the production of a harmless and comparatively tasteless compound.

3. The substance added is absolutely harmless and practically tasteless, and being odourless in itself imparts neither odour nor flavour to the fermented liquor.

4. Unlike Bisulphite of lime which is now largely used by Brewers its successful action as a preservative does not involve the production of a harmful acid, or of an objectionable odour.

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5. If the salt be added in excess no excess of Boracic acid would be produced in the Beer, and hence the use of the salt in excess will not flatten the beer.

6 Cheapness as compared with some effective preservatives now in use

Having now set forth the nature of my Invention of "Improvements in the treatment of fermented liquors for the removal and prevention of acidity" and explained the manner of carrying the same into effect, I wish it to be understood that under the above in part recited Letters Patent I claim:—

The application to fermented liquors of the alkaline Borates and particularly magnesian Borate for fixing the acid or acids produced by after fermentation and simultaneously destroying the germs or organisms which produced such acid or acids

In witness whereof I the said Alfred Gordon Salamon have hereunto set my hand and seal the Nineteenth day of June in the year of our Lord One thousand eight hundred and eighty three.

ALFRED: GORDON SALAMON (L.S.)

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